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Call for Papers

Special Issue on Reproducible Research for Biomedical Informatics

Due date for submissions: May 31, 2016

Reproducible research is of significant concern for researchers, clinical practitioners, and patients globally [1,2]. To further the scientific method and improve health outcomes, practices and processes for true reproducibility extend beyond the methods section of a journal article and into the references as well as the availability of a specific time-stamped repository and databases: query code, research protocols, software code and versioning, datasets, metadata, and more [3]. Given the protected nature of much biomedical research, reproducible research in this domain is complicated, yet still necessary to treat and solve real-world health issues. Though the success of clinical care and trials is heavily dependent upon the validity and reliability of previous research [4], the practices and methods that researchers use to improve the reproducibility of their research is not well documented.

The inability to replicate and reproduce research published in prestigious journals is an area of growing significance [5–8]. Given the potential translation of this research to patient bedside practices, and the need to ensure the most effective use of research funds, high-quality, thorough research methods, workflows and documentation are a necessity for all empirical, computational and analytical research [9].

Much has been published in specific domains about theoretical practices for ensuring research validity. Landis [10] outlines a core set of reporting standards of rigorous study design for preclinical research involving animal studies that cover topics such as randomization, blinding, sample-size estimation, and data handling. Similarly, in the area of psychology, workflows for testing the reproducibility of research are coming to fruition [11]. Yet, the practical methods actually used within the biomedical informatics domain are not well documented or have not historically been positioned within the reproducible research framework.

For example, metadata are a strong component of facilitating reproducible research, and the *Journal of Biomedical Informatics* has previously published on metadata, as a mechanism to facilitate interoperability [12]. Additionally, documentation of information has been covered in various articles within the Journal of Biomedical Informatics [13]. Fields also either within the scope of biomedical informatics but with other primary journals (e.g., imaging informatics [14]), as well as those with overlapping collaborations within biomedical informatics (e.g., biostatistics [15] and computational science [16]) have already published on this topic.

Finally, reproducibility hinges not only on the availability of the documentation, analyses, and data, but on the ongoing accessibility and viability of the files and documents, enhanced through a process of curation. Biocuration enables information discovery and retrieval, maintains quality, adds value, and provides for re-use over time through activities including authentication, archiving, management, preservation, and representation [17]. Much published research has focused on the workflows and case studies for conducting text mining to extract data from published literature as a process of biocuration [18–20], yet this is a limited view of curation, and does not support quality information provenance.

Within this context of reproducible research for biomedical informatics, we encourage you to submit articles about methods to support, improve, validate, or assess the reproducibility of biomedical informatics research.

Topics of interest for submission to this special issue include (but are not limited to):

- Practical methods for replicable research.
- Documenting the research lifecycle (data collection, cleaning, integration, aggregation, analysis, and research writing) for reproducibility.
- Biocuration, and practices for facilitating the ongoing accessibility of academic scholarship.
- Methods to track provenance to ensure data/information quality.
- The use of ontologies and metadata standards to support reproducibility.
- Strategies for assessing and improving upon the reproducibility of research (e.g., self-assessments, text mining, scoring tools, checklists).
- Tools and algorithms (e.g., natural language processing, text extraction, data mining) to automate reproducible workflows.
- Mechanisms or workflows to replicate research.
- Research design methods that supports reproducible research.

This issue will focus on original methodological research papers in these and related areas. In addition, JBI focuses on papers that introduce methodological innovations and tends not to publish papers that describe specific applications that utilize well-established techniques, even if their use in a new context is novel.

JBI is particularly interested in publishing methodological reviews on topics relevant to special issues, and we encourage submissions of this type. Note that such reviews should focus on reviewing methods, not specific applications.

Questions regarding the topics of the special issue should be directed to Dr. Leslie McIntosh <LMcIntosh@path.wustl.edu>.

Peer-review process

All submitted papers must be original and will undergo a rigorous peer-review process with at least two reviewers. All submissions should follow the guidelines for authors, available at the *Journal of Biomedical Informatics* web site (http://www.journals.elsevier.com/journal-of-biomedical-informatics). JBI's editorial policy

http://dx.doi.org/10.1016/j.jbi.2015.12.011

is also outlined on that page (see expanded Aims and Scope) and will be strictly followed by the special issue reviewers.

For manuscripts with supporting documentation (datasets, documentation, analyses), the editors will work with authors to assure that such documentation is made publicly available through an institutional, domain, or general data repository or through a 'Data in Brief' publication as appropriate. For more information see http://www.re3data.org/ and http://www.journals.elsevier.com/data-in-brief/.

Submission process

Authors must submit their papers by May 31, 2016 via the online Elsevier Editorial System (EES) at http://ees.elsevier.com/jbi. Authors should register and upload their text, tables, and figures, as well as subsequent revisions, through this website. Potential authors may contact the Publishing Services Coordinator in the journal's editorial office (jbi@elsevier.com) for questions regarding this process; they should indicate their submission is for the Special Issue on Reproducible Research.

References

[1] S.C. Landis, S.G. Amara, K. Asadullah, A call for transparent reporting to optimize the predictive value of preclinical research, Nature 490 (2012) 187–191, http://dx.doi.org/10.1038/nature11556.
[2] L.P. Freedman, J. Inglese, The increasing urgency for standards in basic biologic research, Cancer Res. 74 (2014) 4024–4029.
[3] M.J. Khoury et al, Transforming epidemiology for 21st century medicine and public health, Cancer Epidemiol. Biomarkers Prevent. 22 (2013) 508–516.
[4] C. Laine, S.N. Goodman, M.E. Griswold, H.C. Sox, Reproducible research: moving toward research the public can really trust, Ann. Intern. Med. 146 (2007) 450–453.
[5] C.G. Begley, L. Ellis, Drug development: raise standards for preclinical research, Nature 483 (2012) 531–533, http://dx.doi.org/10.1038/483531a.
[6] F. Prinz, T. Schlange, K. Asadullah, Believe it or not: how much can we rely on published data on potential drug targets?, Nat Rev. Drug Discov. 10 (2011) 712, http://dx.doi.org/10.1038/nrd3439-c1.
[7] I.S. Peers, P.R. Ceuppens, C. Harbron, In search of preclinical robustness, Nat. Rev. Drug Discov. 11 (2012) 733–734, http://dx.doi.org/10.1038/nrd3849.
[8] C.G. Begley, J.P.A. Ioannidis, Reproducibility in science: improving the standard for basic and preclinical research, Circ. Res. 116 (2015) 116–126, http://dx.doi.org/10.1161/CIRCRESAHA.114.303819.
[9] V. Stodden, What scientific idea is ready for retirement?, Edge (2014)
[10] S.C. Landis, S.G. Amara, K. Asadullah, A call for transparent reporting to optimize the predictive value of preclinical research, Nature 490 (2012) 187–191, http://dx.doi.org/10.1038/nature11556.
[11] Open Science CollaborationAn open, large-scale, collaborative effort to estimate the reproducibility of psychological science, Perspect. Psychol. Sci. 7 (6) (2012) 657–660, http://dx.doi.org/10.1177/1745691612462588.
[12] A. Anil Sinaci, B. Gokce, Laleci Erturkmen, A federated semantic metadata registry framework for enabling interoperability across clinical research and care domains, J. Biomed. Inform. 46 (5) (2013) 784–794, ISSN:1532–0464, http://dx.doi.org/10.1016/j.jbi.2013.05.009.
[13] Rainer Krumm, Axel Semjonow, Joke Tio, Heike Duhme, Thomas Bürkle, Jörg Haier, Martin Dugas, Bernhard Breil, The need for harmonized structured documentation and chances of secondary use – results of a systematic analysis with automated form comparison for prostate and breast cancer, J. Biomed. Inform. 51 (October) (2014) 86–99, ISSN:1532–0464, http://dx.doi.org/10.1016/j.jbi.2014.04.008.
[14] B.A. Wandell, A. Rokem, L.M. Perry, G. Schaefer, R.F. Dougherty, Data management to support reproducible research (2015) arXiv:1502.06900 [q-bio] at <http://arxiv.org/abs/1502.06900>.
[15] John P.A. Ioannidis, Sander Greenland, Mark A. Hlatky, Muin J. Khoury, Malcolm R. Macleod, David Moher, Kenneth F. Schulz, Robert Tibshirani, Increasing value and reducing waste in research design, conduct, and analysis, The Lancet 383 (9912) (2014) 166–175, ISSN:0140–6736, http://dx.doi.org/10.1016/S0140-6736(13)62227-8.
[16] R.D. Peng, Reproducible research in computational science, Science (New York, NY) 334 (2011) 1226.
[17] Data Curation, University of Illinois, Champaign–Urbana. From: <https://www.lis.illinois.edu/academics/degrees/specializations/data_curation> (Accessed on October 1, 2015).
[18] A.D. Howe, M. Costanzo, P. Fey, et al, Big data: the future of biocuration, Nature 455 (7209) (2008) 47–50, http://dx.doi.org/10.1038/455047a.
[19] K.G. Dowell, M.S. McAndrews-Hill, D.P. Hill, H.J. Drabkin, J.A. Blake, Integrating text mining into the MGI biocuration workflow. Database: J. Biol. Databases Curation 2009 (2009) bap019. http://dx.doi.org/10.1093/database/bap019.
[20] D. Kwon S., Kim, S.-Y. Shin, A. Chatraryamontri, W.J. Wilbur, Assisting manual literature curation for protein–protein interactions using BioQRator. Database: J. Biol. Databases Curation 2014 (2014) bau067. http://dx.doi.org/10.1093/database/bau067.

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